

**Background:** Medication review type 3 (MR3) is an advanced, comprehensive and collaborative re-view process engaging the pharmacist, the patient and the general practitioner, designed to optimize treatment, reduce medication errors, minimize waste and improve adherence. Quality assurance is essential for the successful implementation and continuous improvement of MR services. To ensure quality of MR3, the BRussels ANTwerp Medication Review Quality score (BRANT-MERQS) was developed, incorporating 45 general and 4 project-specific criteria. However, a streamlined version is needed to enable more efficient, yet reliable, quality assessments.

**Purpose:** The objective of this study was to create and test a more efficient scoring system to evaluate the quality of MR3.

**Methods:** Given the likelihood of the interdependence of the quality of MR3 components, a hypothesis was formatted that a random subset of BRANT-MERQS quality criteria could efficiently assess MR3 quality. Therefore, based on prior research, the criteria were randomized into a weighted list, to represent the relative importance of the criteria. A truncation value was required to ensure subsample scores aligned with the full sample assessments, generating overall representative quality scores.

**Findings:** Testing the sampling algorithm on the two different datasets of the BRANT-MERQS study revealed that using one-third of the criteria provided a reliable subsample, yielding consistent quality scores with minimal standard deviation. Biased sampling demonstrated advantages over an unbiased approach.

**Conclusion:** By using a biased random selection of BRANT-MERQS criteria, comprising one-third of the total number of criteria, the quality of medication reviews can be assessed significantly more efficiently while maintaining nearly the same accuracy.

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#### Mama Friendly community pharmacies in Serbia –improving medication safety during breastfeeding

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**Background:** Although breastfeeding provides numerous health benefits for both babies and mothers, there are many barriers which interfere with achieving the WHO-recommended rate of exclusive breastfeeding to 50%. Serbia reports only 20% rates of exclusive breastfeeding in infants under 6 months.

**Purpose:** To support breastfeeding, National guidelines for medication use during breastfeeding were published in 2021, which was followed by its promotion and implementation among both pharmacists and breastfeeding mothers through Mama Friendly Project in 2022.

**Method/study design:** Community pharmacists received one-day comprehensive training on the safe use of medications in breastfeeding and subsequently provided pharmaceutical care services. Pharmaceutical care encompassed tailored interventions, such as counseling on medication administration concerning breast-feeding time, recommendation of a safer alternative medication, mothers' referral to a doctor, infant monitoring, and follow-up. E-lactancia was used to assess medication risk/compatibility with breast-feeding. Data were analyzed using SPSS software (ver 28).

**Findings:** A total of 724 breastfeeding mothers received pharmaceutical care interventions during 7 months. The average mothers' age was  $31.2 \pm 4.9$  years, and infants' age  $6.7 \pm 1.4$  months. More than half of mothers were primiparous (57.2%). At baseline, 57.3% of mothers reported concerns about continuing to breastfeed their babies because of the therapy they were using. Almost half of the mothers (46.5%) reported avoiding taking the prescribed medication(s) for their health problem due to fear for babies' safety. When asked about the physicians' instructions regarding medication use/breastfeeding, the majority reported no given advice (51.7%), to continue breastfeeding 41.7% and to cease breastfeeding 4.1%. After the pharmacists' intervention, the proportion of high-risk

(unsafe) medications decreased from 1.8% to 0.6%, and low-risk (fairly safe) medications from 19.5% to 18.2%. The risk class of dispensed medications significantly decreased during the study ( $p=0.015$ ). Follow-up was performed face-to-face in 50.6% and via phone in 25.7% of cases. Pharmacists' interventions and ad-vice were accepted by 80% of mothers and rejected by 0.9% (unknown 14%). Recommendations for infant monitoring were given to 46.2% of mothers, while an effect was seen in 3.5% of babies (diarrhoea, rash, irritability, constipation, dark stools, oral candidiasis, sleepiness or vomiting).

**Conclusion:** Mama Friendly Project revealed high health and information needs in breastfeeding mothers, regarding medication use. Community pharmacists proved their significant role in improving the safe use of medications during breastfeeding, increasing the adherence level and breastfeeding continuation, which enables achieving desired health outcomes for both mothers and babies.

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#### Evaluating the Implementation of a Digital Health Intervention in Underserved Rural Areas of Portugal: the MobiMad@PT project

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**Background:** Medication non-adherence poses significant challenges to managing chronic conditions, particularly cardiovascular diseases, which remain the leading cause of morbidity and mortality globally. Health-care access barriers and geographical isolation further exacerbate this issue. Digital health interventions, including automated dose dispensing systems like Mobili®, present innovative solutions to address adherence challenges, improve health outcomes, and enhance healthcare sustainability in underserved populations.

**Purpose:** This project aims to study the implementation of Mobili®, a portable automated dose dispensing system developed by Medthings (a Norwegian start-up), as part of a broader digital health intervention tailored to underserved populations in Portugal. It seeks to evaluate how this intervention can be effectively integrated into primary care systems to improve medication adherence and address healthcare disparities among underserved populations.

**Method/Study Design:** The project employs an implementation science framework with structured work packages (WPs) that encompass:

1. Tailoring Mobili® to the specific needs of underserved populations of Portugal through stakeholder engagement and usability testing.
2. Assessing the rollout of Mobili® using both qualitative and quantitative methods, including patient engagement, adherence rates, and healthcare provider feedback. A Parallel-group, Staggered enrollment, Randomized Controlled Trial (RCT), with 1:1 allocation ratio will assess the effectiveness of the device among patients with cardiovascular diseases. Participants will be recruited from community pharmacies, targeting non-institutionalized adults aged 18 years or older requiring only regular oral medication that can be dispensed in the eDose. The eDose preparation will follow the guidelines of the Portuguese Pharmaceutical Society for the Dose Administration Aid (DAA) Service. The control group will use the current DAA system available in the pharmacy.
3. Using the Consolidated Framework for Implementation Research 2.0 (CFIR) to explore key factors influencing the success of the intervention, such as context, adaptability, and stakeholder involvement.
4. Sharing evidence-based findings with policymakers, healthcare providers, and other stakeholders to inform broader adoption and scalability.

**Findings:** Although findings are not yet available, the project will deliver critical insights into the practicalities and effectiveness of implementing digital health interventions in underserved contexts. It will explore patient adherence patterns, user experiences, and the intervention's integration into existing healthcare systems.

**Conclusion:** This project's findings will contribute to better understand the impact of digital health interventions on medication adherence, and will be valuable to researchers in medication adherence and implementation science.

The successful real-world application of the project's outcomes could also enable the promotion of a culture of adherence within the community.

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### Identifying the potential inappropriate prescriptions in community-dwelling older patients by using GheOP<sup>3</sup>S tool

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**Background:** Older adults tend to have more than one chronic disease and polypharmacy, which can be resulted in inappropriate prescriptions.

**Purpose:** The objective was to identify potential inappropriate prescriptions through a medication review for community-dwelling older adults.

**Methods:** This study was conducted prospectively in community pharmacies between 1 February and 30 June 2024. The study included patients who came to the community pharmacy for any reason, used at least one medication regularly, were over 65 years of age, and provided consent. The medication review was performed using the Ghent Older People's Prescriptions Community Pharmacy Screening (GheOP<sup>3</sup>S version 2) tool (1). The GheOP<sup>3</sup>S tool consists of 5 sections (potentially inappropriate medication, potentially inappropriate medication dependent on comorbidities, potentially omitted medication, drug-drug interactions especially relevant in older people, pharmaceutical care-related criteria to be addressed in the community pharmacy) and 64 criteria, in total.

**Findings:** The study included 100 patients, 55% of whom were female. The mean age of the patients were 70.6 ( $\pm$  4.9) years. The most prevalent chronic diseases were hypertension (n=55), type 2 diabetes mellitus (n=43) and hypercholesterolemia (n=32). Polypharmacy (use of five or more medications) was identified in 64% of patients, with a mean of 5.2 ( $\pm$  2.2) medications per patient. A total of 345 issues could be resulted in potential inappropriate prescriptions were detected in 89 patients. It was found that 76 (22%) of these issues were caused by potential inappropriate medication use, 76 (22%) by potentially omitted medication and 70 (20%) by drug-drug interaction. The remaining 123 (36%) were from the category of pharmaceutical care-related criteria to be addressed in the community pharmacy. Regardless of the categories, the most prevalent issue across all GheOP<sup>3</sup>S criteria was the use of vasodilator drugs (n=48). The other common issues were the lack of annual influenza vaccination (n=38), and the use of combination of medications that increase the risk of falls (n=37).

**Conclusion:** In this study, the frequency of polypharmacy and potentially inappropriate prescribing was found to be high in community dwelling older patients. The community pharmacist-led interventions could be used to prevent, identify, and solve potential inappropriate prescribing in older adults.

#### References:

Foubert K, Capiou A, Mehuys E, et al. Ghent Older People's Prescriptions Community Pharmacy Screening (GheOP<sup>3</sup>S)-Tool Version 2: Update of a Tool to Detect Drug-Related Problems in Older People in Primary Care. *Drugs Aging*. 2021 Jun;38(6):523-533. <https://doi.org/10.1007/s40266-021-00862-6>.

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### Shaping tomorrow's pharmacists: A scoping review on future skills and educational strategies

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**Background:** According to the WHO [1], global challenges in healthcare systems require a redefinition of health care teams, a broader perspective on competencies as well as an expansion of the professional roles of pharmacists [2]. Whilst clinical competencies remain crucial, recent societal and technological developments, including AI, underscore the importance of transversal

competencies –alternatively determined as future or 21st century skills [3,4]. A variety of future skills frameworks exist that originate, for instance, from a labor market (e.g. Future of Jobs Report, World Economic Forum [5]) or education policy perspective (e.g. OECD Learning Compass [6]) including problem-solving competence to deal with new challenges in healthcare or collaboration competence to work in increasingly interdisciplinary teams. Beyond, self-directed learning competence is essential to adapt to changing work requirements and take on new roles. Future skills research indicates that acquisition and development of future competencies require modern teaching techniques.

To date, no future skills approach has been developed specifically for pharmacists, but studies identifying the most important future skills for pharmacists are available as well as studies that emphasize the role of curricula development and modern teaching techniques in undergraduate pharmacy education.

**Purpose:** We aim to synthesize the existing literature on future competencies that pharmacists will need to maintain and efficiently expand their professional roles in healthcare. Additionally, we will explore initiatives on educational curriculum development and associated teaching methods suitable for pharmacists.

**Methods:** A scoping review will summarize data of two literature reviews: (1) to identify the most relevant competencies required for pharmacists for new roles and responsibilities in healthcare. The competencies will include future skills typically included in future skills frameworks and exclude professional competencies related to clinical and pharmacological knowledge. (2) to review existing initiatives in undergraduate pharmacy curricula aimed at enhancing these competencies. The scoping review will be conducted in relevant databases (PubMed, Scopus, ERIC, WoS) and in pharmaceutical journals (members of the Granada statement).

**Findings:** During the preliminary search, for instance the following competencies were identified: leadership, problem solving, design thinking, (digital and intercultural) communication, (interdisciplinary) collaboration, self-directed learning or data literacy.

The scoping review will be conducted in December 2024-January 2025

**Conclusion:** This scoping review provides an overview of future competencies beyond professional skills required for pharmacists to adopt new roles in healthcare. Approaches for curriculum development and teaching methods in pharmacy with regard to single or a broader set of future skills will be summarised.

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### A global outlook of pharmacist independent prescribing in community pharmacy: A scoping review

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**Background:** Pharmacist prescribing has expanded in recent years, with independent prescribing gaining notoriety. Pharmacist independent prescribing services are being implemented as a strategy to alleviate the increasing pressure on overstretched health systems worldwide. Two models are identified: standard of care prescribing, where pharmacists can prescribe for any condition within their competence, and government protocols prescribing, limiting prescribing to specific conditions and medications outlined in official protocols. Considering the heterogeneity across countries, it is crucial to explore and understand the diverse models to inform future policies and practices.

**Purpose:** To identify countries and territories where pharmacists prescribe independently in community pharmacy and summarise their prescribing models.

**Method:** Literature on prescriptive authority of pharmacist independent prescribers was included. And literature describing dependent prescribing models, non-community pharmacy settings, opinions, economic or clinical outcomes on pharmacists prescribing was excluded. Five databases were used for the search: Scopus, Web of Science, CINAHL, PubMed, and Cochrane, along with the Google search engine for grey literature.

**Findings:** The following countries were identified: United Kingdom, Canada, United States, Australia, Poland, Switzerland, Denmark, and France. In the